"Countries and economies that invest in professional capital recognize that educational spending is a long-term investment in developing human capital from early childhood to adult life, to reap rewards of economic productivity and social cohesion in the next generation. A big part of this investment is in high quality teachers and teaching"

Professional Capital, Hargreaves and Fullan (2012)

Promethean Education Strategy Group
Teacher Effectiveness

Promethean

Contents

Summary

Digital technologies are underpinning economic growth and have transformed society. Governments recognise the growth relationship between education, society and economic growth and have invested in ICT (information and communication technologies) in education. Youth has adapted to making use of ICT more than teachers have and despite a decade of ICT teacher-training, the potential to transform learning is still untapped. If countries are to bridge the achievement gap, they need to look more closely at the quality of teachers and of professional development.

The landscape of ICT-PD in the last decade focused on how to use digital tools rather than how to adaptively integrate them into learning[i]. This research report argues that it is unlikely that more of the same traditional one-off teacher ICT-professional development (ICT-PD) will help schools to improve the quality of teaching and bridge the achievement gap. The report investigates teachers' account about their use of ICT in learning and what motivates them to learn in order to enhance the development of future ICT-PD. The three themes that emerged from the study are teachers' adaptive expertise, the pedagogical use of ICT and leadership and building relationships within the school.

• The primary missing link is the lack of attention given to nurturing adaptive expertise in ICT-PD, and considering teachers as learners. The report stresses the importance of adaptive experts as compared to routine-experts and experienced teachers.
• The second is the pedagogical use of ICT; for teachers to shift from traditional approaches of teaching towards more progressive and socio-constructive methods, ICT-PD needs to include pedagogical knowledge and guide teachers in a practice-based approach, learning by doing and engaging their students in complex real-life problems.

• The third is leadership and building relationships within the school. Having leadership's trust has a catalytic impact on teachers' self-confidence which motivates them to keep learning and growing professionally.

Quality ICT-PD appeals to teachers' intrinsic motivation and provides them with qualifications that they value, hence contributing to their professional growth. In conclusion the report proposes a recommendation for a new ICT-PD paradigm and contends that ICT-PD should be considered from a school approach in which it is vital to provide leaders with ICT-PD to enable them to support classroom pedagogical transformation.

Introduction and Problem

Digital technologies in learning

Digital technologies are underpinning economic growth and have transformed the way we live, learn and work. Today's youth has adapted rapidly and is significantly more engaged in societal issues through the use of ICT (Information and Communication Technologies) in informal learning spaces rather than in formal education[ii]. Teachers on the other hand have been much less adaptive to the continuously changing digital and technological environment despite the significant strides that governments have taken to provide them with ICT-PD (Information and Communication Technologies Professional Development).

Indeed, the past decade has witnessed numerous initiatives to help teachers learn how to use digital technologies in learning. Yet, in spite of those initiatives, this period has contributed little towards transforming learning. Why is this so? The limited influence could partly be due to the fact that conditions required for successful ICT integration in learning are not always afforded, the culture of learning and the fact that most ICT-PD focused on learning how to use the tool rather than its effective use, which requires integrating it more thoroughly into learning[iii]. In other words, the 'how to use' has been prioritized over the 'how to integrate'. Therefore, in spite of the wealth of transformative potential of digital technologies, in most cases the introduction of digital technologies has done little more than reinforcing traditional learning that is not adaptive to the changing digital technological world.

Teachers' quality, a driver of economic growth

The recently published report of PISA 2012 reinforces the historical growth relationships between education, society and economic growth (Pisa 2012: p33)[iv]. The Programme for International Student Assessment

(PISA) is the international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students[v]. If countries are to bridge the achievement gap, they need to look more closely at the quality of school systems and the quality of teachers, hence the urgency to look at professional development. We argue that it is unlikely that more of the same traditional teacher ICT-professional development (ICT-PD) will help schools to improve the quality of teaching and bridge the achievement gap. ICT-PD that nurtures teachers' adaptive expertise is critical to ensure that teachers are able to keep up with technologies and to prepare their students for a world that is increasingly relying on technological advancement.

Identifying high quality teacher ICT-PD

Research and experience have shown that high quality teacher ICT-PD can be powerful and effective when the content and processes that teachers learn are integrated into their practice, hence, providing a direct impact on students' learning outcomes. Quality ICT-PD appeals to teachers' intrinsic motivation and provides them with qualifications that they value, hence contributing to their professional growth.

Quality ICT-PD should prioritize the competences that teachers need to learn and adapt to, providing them with a space to develop the dispositions they need to model and enabling them to learn by doing in the context of their classroom. It provides ongoing support and guidance (rather than one-off seminars or workshops); it reflects a balance in practices which makes it easy for teachers to know when ICT should be used and which approach is needed at a certain time. In the process, ICT-PD transforms teachers' practices, approaches and perception of themselves. They become more adaptive and confident learners, and the ICT-PD becomes a source of professional growth.

Looking into the matter

This brief report represents early findings of in-depth interviews and focus groups conducted in 2013 with fourteen Lebanese high school teachers from public and private schools who are experienced[vi] in the use of ICT in learning.

To better understand teachers' present use of ICT and motivation to grow professionally we asked teachers two main questions: How are you currently using ICT in learning? What motivates you to learn and grow professionally?

The aim was to comprehend how they handle ICT in learning and what motivates them to learn. These questions were asked in order for us, professional development designers, to enhance the development of future ICT-PD and reach out effectively to teachers' needs.

After presenting the context in which ICT-PD exists today, the report explores three themes that emerged out of the discussions based on an inductive process similar to grounded theory: 1) the notion of adaptive expertise, 2) the pedagogical use of ICT in learning, 3) leadership and building relationships within the school context.

The context of ICT-Professional Development (ICT-PD)

Teaching about ICT vs. adaptively integrating it into learning

The formal education and learning approach in Lebanon responds to a system that is bureaucratic and hierarchical; in which "curriculum, content, culture, and most important, the examination system favour traditional, teacher-centred, fact-based, rote instruction and fail to account for the use of technology" (Burns, 2012. p78). The trend in the past decade of ICT-PD was to focus on teaching teachers how to use digital tools rather than how to adaptively integrate them into learning and was largely led by technology rather than education experts.

Generally speaking, teachers first needed to become technologically literate and learn how to use software applications (such as Word, Excel®, or PowerPoint®). They were then encouraged to work on ICT-based projects in an attempt to apply the acquired ICT skills. The aim was for teachers to progressively learn how to use digital technologies for Knowledge Deepening and ultimately for Knowledge Creation, which were identified by UNESCO as ICT competences for teachers. In the Knowledge Deepening phase, teachers are meant to develop the competences to make use of ICT in order to enable students to acquire in-depth knowledge of their school subjects and apply it to complex, real-world problems. In the Knowledge Creation phase, teachers are meant to enable their students to create the new knowledge required for more harmonious, fulfilling and prosperous societies[viii].

One-off training vs. professional development

The current ICT-PD culture is more oriented towards ICT training courses than professional development (PD) and consists of face-to-face one-off interventions and know-how about ICT skills. Recent studies on teacher professional development in Lebanon reveal the negative attitude teachers have towards it, in particular, their perception that these workshops have little impact on their teaching practices (and hence on the learning of their students) and professional growth (Nahbani et al, 2012)[ix] .

These negative experiences and perceptions of professional development reflect the old paradigm of the one-off teacher PD workshop that makes ineffective use of teachers' time and the resources invested in professional development. Indeed, research surrounding how teachers learn and how school organise professional development confirms that it is unlikely for teachers to adopt new approaches in their classrooms as a result of one-off PD (Darling-Hammond, 2009)[x]. Those sessions often leave teachers with doubts and questions such as, "How and where does this fit in my curriculum?", "How will I change what I've been doing to incorporate this new approach?", "How will it impact my students' grades?", etc.

ICT as a means to front-load content

Aside from these doubts, teachers are anxious because of examination pressure. With the high value given to end-of-school exams and with the focus of the high school curriculum on content knowledge , teachers often stall at integrating ICT into knowledge transfer and student acquisition of knowledge. This partly explains the inclination of teachers to use ICT in presentations focussing on demonstrating and delivering content to their students rather than taking their students a step further and engaging them in creating and sharing knowledge based on the subject that they are learning. In the next section, we argue that the missing link in ICT-PD is the notion of teachers' adaptive expertise.

Themes
Teachers' adaptive expertise: The missing link

"Adaptive expertise is a broad construct that encompasses a range of cognitive, motivational, and identity or personality-related components, as well as habits of mind and dispositions" (Lin, Schwartz, &, Hatano, 2005)[xii].

Adaptive Experts, Routine Experts and Experienced Teachers

Adaptive expertise is characterised by a sense of constantly learning from one's own practice. This differs from routine expertise which is characterised by a reliance on automated, effortless problem-solving, which is the current norm in approaches to teaching and learning.

Adaptive expertise is characterised by a sense of constantly learning from one's own practice.

We argue there that the primary missing link between prevailing ICT-PD and the large human capital in schools is the lack of attention given to nurturing adaptive expertise.

Teachers develop competences, students develop deeper understanding

The concept and practice of adaptive expertise promoted by important research studies, such as Riel et al (2009[xiii]) focusing on teachers' instructional problem solving and the integration of digital technologies in learning, and Hattie (2003[xiv]) emphasizing the importance of understanding learning, distinguishes between expert teachers and experienced teachers.

The promotion of adaptive expertise is largely due to the need for teachers to develop for themselves the range of competences and dispositions they want to promote in their teaching. They have to model the learning dispositions and strategies that will prepare students to be collaborative, critical thinkers and creative problem solvers. In addition to the set of cognitive skills developed in routine expertise, adaptive experts use a set of socio-emotional, meta-cognitive and dispositional strategies which are important if they are to prepare their students to become critical, creative and collaborative. For teachers who are learning how to make use of digital technologies, the notion of adaptive expertise implies progression as they continuously apply and reflect on learning from their practice and engage in an unimpeded process of growth and transformation.

Studies conducted to measure teachers' reasoning show that adaptive expertise enables a way of teaching that prioritizes learning through flexible forms of problem solving, reflective thinking and cycles of innovation[xvi]. This form of expertise evolves from the "process of transforming problems of practice into questions, using these questions to shape action, and reflecting on the results to frame new questions[xvii]" (Riel et al, 2009). The process is constantly evolving in an inquiry model so that experienced teachers develop a greater level of technology expertise as they adapt to a process of continually integrating digital technologies.

In education, an adaptive expert is quite different from the routine expert who might know their lessons thoroughly and can deliver the same lesson content mechanically over time. Many have argued that

routine-expert driven educational systems encourage teachers to become routine rather than adaptive experts as they accumulate years of teaching experience.

Hattie's (2011) research on the influences on students' achievements reiterates the importance and need to develop excellence in teachers as it is the single most powerful influence on students' achievement. The heart of the matter is to determine the differences between experts and experienced teachers. He explains that one of the major differences between expert and experienced teachers is the degree of challenges that they present to students, and most critically, in the depth of processing that their students attain as they reflect on the subject at hand[xviii].

"Students who are taught by adaptive expert teachers exhibit an understanding of the concepts targeted in instruction that is more integrated, more coherent, and at a higher level of abstraction than the understanding achieved by other students"[xix].
(Hattie, 2009:238)

While all students might pass their state exams, the crucial difference between those being taught by routine expert teachers versus those being taught by adaptive expert teachers is that the latter take their students from surface knowledge to deep understanding; they engage their students to use their knowledge in new, complex and real life situations. This deep learning enables students to think critically and act flexibly with the knowledge they have acquired in the outside world. In other words, adaptive teachers prepare students with the competences needed to face the world of tomorrow.

Adaptive teachers prepare students with the competences needed to face the world of tomorrow.

What teachers say
- *Where and how teachers learn about ICT to grow professionally (teachers quotes):*

o "We look for and select what we need online; we prefer to decide about our professional development courses."
o "We have learnt a lot from other teachers even if they are in the same system as us, from observing other teachers, from high level conferences, from exchanges."
o "Teachers don't like to be told what to do."
o "We try out new ICT tools to see what they offer."

Teachers as learners: a paradigm shift

These statements reflect what research has found about the old one-off paradigm practices of teacher PD where all staff are coerced into professional development that is disconnected from practice, versus the new teacher PD paradigm that provides learner-centred approaches with teachers as learners. Teachers' account of how they learn and use digital technology is non-linear, hence not aligned with the ICT for teacher competences. This may result in a patchy growth model which depends on teachers' awareness of their needs to deepen their content knowledge and their aspirations for pedagogical knowledge.

Teachers seem to be learning in an innovation cycle driven by new technologies rather than an inquiry and reflective cycle to improve their pedagogical practices. Though innovation can bring excitement about learning and trying out new tools, it is unlikely that it will nurture teachers' adaptive expertise, which requires teachers to learn in an inquiry and reflective cycle. Such findings corroborate research (Nahbani et al, 2013) conducted in Lebanon around teachers' perception about school professional development which calls for a serious effort to curb the present learning culture in schools . How these notions co-exist in the hierarchical and bureaucratic systems within school cultures are questions that are not addressed in this report, but it is worth noting the importance of this clash of transformative culture with the existing educational systems.

Pedagogical use of ICT

Digital technologies in learning enable teachers to engage students with the content that they are studying in critical, creative and collaborative ways to address complex, real-world problems, to create and share what they are learning.

Making effective use of digital technology in teaching requires teachers to know how to use ICT tools, be knowledgeable about the subject that they teach and have pedagogical knowledge[xxi]. It requires a shift from traditional instruction methods towards more progressive and socio-constructive learning. The three elements (Technology, Content Knowledge, and Pedagogy) are collectively important for teachers to integrate ICT effectively in learning. For example, teachers should know their subject very well if they are to use it flexibly and engage their students to use it in real-life problems. Similarly, if teachers are used to transferring knowledge didactically and expect their students to passively internalise the content, they need to develop new teaching strategies and approaches that are more participatory. As explained by Shulman it is a matter of professional growth because teachers' pedagogical and content knowledge is constantly evolving as they refine their practices and develop depth of knowledge of their own subject matter.

What this means is that the new paradigm of ICT-PD should go in tandem with pedagogical knowledge so that teachers' practices evolve as they learn which approach to use with or without ICT. Developing the three elements (technology, content knowledge and pedagogy) in the current educational context is challenging for teachers because:

1. Digital technologies are mainly taught disconnected from teachers' practice (in other words – it is not adapted to their context – or helping teachers to learn how to adapt).

2. Teachers need to develop a deeper understanding of their subject knowledge in order to feel comfortable using that knowledge with ICT in new situations.

3. Teachers need to develop pedagogical underpinning to their teaching. This covers the why and how we teach; while it is at the heart of teaching, it is not within the scope of this study.

4. The high focus on content in high school curriculum does not entice teachers to engage students in problem solving or creating new knowledge.

Pedagogy is also about teachers being learners and understanding what is involved in the process of being a learner. It is about using ICT tools themselves to collaborate with each other for example, which would further motivate them to enhance their practices and use it creatively. Teachers are increasingly aware of the importance of pedagogical knowledge and recognise the need to develop stronger foundations to leverage the use of ICT in learning.

What teachers say

- *Pedagogical foundations are important*

  "The technology is ahead of us and there is no way that we can follow its pace. It is really not about the ICT but about pedagogy. It is easy to get overwhelmed with so many applications. The teachers who have a strong pedagogical foundation are ahead of others." Teacher quote

- *The use of ICT in learning*

  o "Students research topics and create presentations or videos; depending on the project, students work after class or during the breaks. Using a collaborative platform helped me to organise and follow students' group work; we use ICT to collaborate with other schools internationally"

  o "Critical challenges in my curriculum transformed their class, my students engaged in sustained strands of inquiry and deep learning. Designing the unit and sharing it visually in a collaborative environment helped my students to visualise the process, be connected, interact and constantly know where they are in the process; the parents could follow their work and progress". *Teacher quotes*

Beyond ICT-based projects

Teachers use ICT in learning ranges from knowledge transfer to knowledge creation. Aside from using ICT to enhance the content of their lessons and create interactive presentations, teachers engage their students in ICT-based projects that encompass research and inquiry. Interestingly, the difference in the account of teachers seems to depend on the subject that they teach rather than if they teach in the public or private sector. With the exception of teachers referring to inquiry and critical challenges, ICT-based projects seem to take place over and above regular classroom teaching, thus creating additional work and tensions on teachers. This might be explained by several factors, such as:

a) Pedagogical strength: the lack of teachers' pedagogical strength to design learning or plan activities around their curriculum/content which would include the use of ICT when needed;

b) Examinations: the declarative nature of examination, the focus on content in the curriculum and preparing students for traditional assessment;

c) Availability of ICT: the lack of access of several teachers to use ICT and Internet in class.

Assessment with ICT is still absent

Assessment seems to rely heavily on traditional methods which might explain the lack of use of ICT in formative or summative assessment. The rhetoric of assessment is vital, from a critical-cognitive[xxiii] and a socio-emancipatory[xxiv] perspective. While it is common for teachers to speak about enhanced learning experiences resulting from the use of ICT in learning, there seems to be an emphasis on socio-emancipatory changes, which is translated in students' motivation to learn and sense of responsibility and empowerment rather than on criticality and cognition. This is probably due to the fact that the majority of teachers make use of ICT-based projects as an extension of learning; hence they are not formally assessed. As teachers conduct ICT-based learning they need to be able to articulate how they know that their students are developing deeper understanding and consider assessment as part of learning. It is therefore arguable that teachers need to develop deeper pedagogical knowledge in order to adapt and effectively use ICT in assessment for learning.

Leadership and building relationships within the school context

Teachers' accounts of their use and integration of ICT as they engaged their students in inquiry and critical challenges reported a dramatic transformation in school relationships (between teachers and students, amongst students, and between teachers and principals). These accounts are significant as students' achievements are considerably higher when teachers know their students better[xxv] both academically and personally.

The power of trust and self-confidence

Teachers' accounts included: getting to know their students really well; more equity in the classroom; gaining their students' respect; and their principal's trust. The power of trust from their principals' in turn generated a boost of teachers' self-confidence. These accounts indicate the beginning of a more equitable and horizontal type of partnership between teachers and students and a growing reliance on students to assist in the use and integration of digital technologies in the classroom.

What teachers say,
  o "I got to know my students really well and it is only now that I realise how important it is. I have discovered their potential, they are more responsible for their own work and they enjoy what they are learning."
  o "I feel that I am equal to my students, there is freedom in my class."
  o "I have gained the trust of my principal and I feel so much more confident. I can take risks and try out using new strategies and ICT in my class because I am not afraid to take risks". *Teachers' quotes*

Supportive leadership, enabled teachers

The role of leadership is crucial in improving the context at school for digital technologies to drive better educational outcomes. Teachers who feel supported in their learning and in their practice are more motivated, committed and enabled to support their students (McLaughlin & Talbert, 2009)[xxvi]. The more principals understand the benefits and challenges of using of ICT in learning, the more supportive they are to their teachers. When school leadership actively engages in what is going to be delivered (as well as how it is delivered) to their teachers they can better understand its value and are therefore able to provide space for teachers to venture into its adaptive use and integration. Principals who push teachers to integrate the pedagogical use of ICT trust that once teachers have completed the ICT-PD they will apply what they have learnt in their practice even if they fail-forward.

> "The single most important factor common to successful change is that relationships improve. If relationships improve, schools get better. If relationships remain the same or get worse, ground is lost" . (Fullan, 2002)

Leadership supports systemic classroom change

Leaders' support of classroom change is vital for the whole school to engage in ICT in learning. With the focus on achievements, it is possible to oversee or neglect relationships which are also important for school systems to improve. The improved relationships towards greater collaboration and equanimity should be taken in consideration because they are encouraging classroom

processes that seem to counter the impact of top-down processes. It encourages a school culture that is less individualistic, authoritarian and competitive towards one that is more collegial and collaborative. As explained by transformative education theoretical perspectives, the improvement of relationships can help to foster critical consciousness (Drixx, 1998[xxviii]) as they "allow students and teachers to develop genuine relationships in which the educator makes a difference in the students' lives and feels a difference in his or her own life as well (Cranton, 2006, p8)[xxix]". It is also important to note that improved relationships are leveraged with pedagogical rigor, in order to achieve better results.

Conclusion

A new paradigm of ICT-PD should focus on a school approach that aims to nurture home grown and internal adaptive expertise to leverage human capital in schools. A new paradigm should consider teachers as learners in tandem with pedagogical knowledge so that teachers' practices evolve as they adopt new approaches.

It is essential to provide leaders with ICT-PD to enable them to support classroom pedagogical transformation, teachers' professional growth and students' learning outcomes, collaborative inquiry and innovative practice in schools. Having leadership's trust has a catalytic impact on teachers' self-confidence which motivates them to keep learning and growing professionally. Teachers' learning is non-linear and there seems to be an agreement amongst teachers about the need to develop pedagogical knowledge in order to leverage the potential of digital technologies in learning.

The notion of teachers' adaptive expertise implies growth and transformation, rather than a routine set of skills, which they might develop as they learn to make effective use of digital technologies. How to integrate ICT in learning should include pedagogical knowledge which will help teachers to adapt to more progressive and socio-constructive learning approaches that fit their classroom needs.

Teachers' motivation is intrinsically generated by a set of factors starting from their enhanced relationship with students to the trust of their principals and the confidence

to teach in new ways. This represents the beginning of a partnership between teachers and students in classroom learning which can be leveraged in the whole school. If we transform the pedagogy in classrooms, then schools will grow to become more collegial and dynamic learning environments. It highlights the prominence of socio-emancipatory transformation in school relations which has generated a lot of motivation and value to learning. Leveraging motivation with ICT-PD is important to provide pedagogical knowledge and rigor while deepening critical-cognitive transformation and driving better students' achievements.

Recommendations

In summary, the following recommendations are proposed for effective ICT-PD in learning; ICT-PD should provide:

- A participatory school approach to ICT-PD addressed to the school's stakeholders focused on enhancing students' achievements and learning outcomes
- Capacity building of leadership so that they value and provide space for teachers' professional growth and adaptive expertise
- A learner-oriented and practice-based approach that engages teachers as learners in doing and applying in their classroom, reflecting and inquiring around practice
- Space for collaboration, a) between teachers and students so that they learn to engage their students meaningfully, b) amongst educators as they learn together and build communities of practice, c) between educators and subject-matter experts to contribute with current know-how and proficiency
- Space for teachers' professional growth and guidance in the process of designing learning so that students' engagement is sustained in strands of critical inquiry
- Valuable qualifications and intrinsic motivation to teachers

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An early adopter of ICT in learning, she has pioneered global projects since 1999 and created the award winning iEARN-USA online teacher professional development courses, which have reached over 2,500 educators in over a 100 countries. She co-designed and led the Douroub ICT-based professional development programme and platform for Yemen as part of the national "Quality of Education" programme with the Social Fund for Development. In partnership with Cisco Systems and in collaboration with the Ministry of Education in Lebanon, she developed the I-DO programme to have teachers and students create re-usable digital educational content (videos, wikis and blogs) that supports the existing curriculum.

She is a co-founder of two non-profits, the International Education Association IEA (Lebanon, 2003) and the Global Teenager Foundation (Netherlands, 2011) and of Ennoveo (Lebanon, 2011).

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